

ACT Elementary Algebra Problem Set 2

- The minimum fine for driving in excess of the speed limit is \$25. An additional \$6 is added to the minimum fine for each mile per hour (mph) in excess of the speed limit. Rachel was issued a \$103 fine for speeding in a 55-mph speed limit zone. For driving at what speed, in mph, was Rachel fined?
 - 48
 - 52
 - 62
 - 68
 - 78
- $5x^3 \times 2xy \times 3xy^2$ is equivalent to:
 - $10x^3y^2$
 - $10x^5y^3$
 - $30x^3y^3$
 - $30x^5y^3$
 - $30x^5y^2$
- When written in symbols, "the product of r and s , raised to the fourth power," is represented as:
 - r^4s^4
 - $(r + s)^4$
 - $(rs)^4$
 - $\frac{r^4}{s^4}$
 - rs^4
- If $mn = k$ and $k = x^2n$, and $nk \neq 0$, which of the following is equal to m ?
 - 1
 - $1/x$
 - \sqrt{x}
 - x
 - x^2
- If $7x + 5 = 2x + 9$, then $x =$?
 - $\frac{4}{5}$
 - $1\frac{4}{5}$
 - $\frac{4}{9}$
 - $1\frac{4}{9}$
 - 2
- If x is a positive real number such that $x^2 = 16$, then $x^3 + \sqrt{x} =$?
 - 18
 - 20
 - 66
 - 68
 - 74
- Which of the following is a simplified form of $4x - 4y + 3x$?
 - $x(7 - 4y)$
 - $x - y + 3x$
 - $-8xy + 3x$
 - $7x - 4y$
 - $-4y - x$
- Gary has turtles, cats, and birds for pets. The number of birds he has is 4 more than the number of turtles, and the number of cats is 2 times the number of birds. Of the following, which could be the total number of Gary's pets?
 - 14
 - 18
 - 20
 - 22
 - 26
- If $b = a - 4$, then $(a - b)^3 =$?
 - 64
 - 16
 - 4
 - 16
 - 64
- If g is an integer, which of the following could NOT equal g^2 ?
 - 0
 - 1
 - 4
 - 8
 - 9
- If $n^x \cdot n^8 = n^{24}$ and $(n^6)^y = n^{18}$, what is the value of $x + y$?
 - 7
 - 9
 - 12
 - 19
 - 27

12. What is the slope-intercept form of $9x + 3y - 6 = 0$?
- F. $y = 9x - 6$
 G. $y = 3x + 2$
 H. $y = 3x - 2$
 J. $y = -3x + 2$
 K. $y = -9x + 6$
13. For all pairs of real numbers M and N where $M = 6N + 5$, $N = ?$
- F. $\frac{M}{6} - 5$
 G. $\frac{M}{5} + 6$
 H. $6M + 5$
 J. $\frac{M - 5}{6}$
 K. $\frac{M + 5}{6}$
14. When x is divided by 7, the remainder is 4. What is the remainder when $2x$ is divided by 7?
- A. 1
 B. 4
 C. 5
 D. 7
 E. 8
15. The average of 7 consecutive numbers is 16. What is the sum of the least and greatest of the 7 integers?
- A. 13
 B. 14
 C. 16
 D. 19
 E. 32
16. For which of the following functions is $f(-5) > f(5)$?
- A. $f(x) = 6x^2$
 B. $f(x) = 6$
 C. $f(x) = 6/x$
 D. $f(x) = 6 - x^3$
 E. $f(x) = x^6 + 6$
17. If x and y are positive integers such that the greatest common factor of x^2y^2 and xy^3 is 27, then which of the following could y equal?
- A. 81
 B. 27
 C. 18
 D. 9
 E. 3
18. For real numbers r and s , when is the equation $|r - s| = |r + s|$ true?
- F. Always
 G. Only when $r = s$
 H. Only when $r = 0$ or $s = 0$
 J. Only when $r > 0$ and $s < 0$
 K. Never
19. Which of the following is the set of all real numbers x such that $x - 3 < x - 5$?
- A. The empty set
 B. The set containing only zero
 C. The set containing all nonnegative real numbers
 D. The set containing all negative real numbers
 E. The set containing all real numbers
20. If each element in a data set is multiplied by 3, and each resulting product is then reduced by 4, which of the following expressions gives the mean of the resulting data set in terms of x ?
- A. x
 B. $3x - 4$
 C. $x + \frac{4}{3}$
 D. $\frac{x}{3} + 4$
 E. $x + \frac{4}{3}$
21. Kate rode her bicycle to visit her grandmother. The trip to Kate's grandmother's house was mostly uphill, and took m minutes. On the way home, Kate rode mostly downhill and was able to travel at an average speed twice that of her trip to her grandmother's house. Which of the following expresses the total number of minutes that Kate bicycled on her entire trip?
- F. $3m$
 G. $2m$
 H. $m + \frac{1}{2}$
 J. $\frac{3m}{2}$
 K. $\frac{m}{2}$
22. Let n equal $3a + 2b - 7$. What happens to the value of n if the value of a increases by 2 and the value of b decreases by 1?
- A. It is unchanged.
 B. It decreases by 1.
 C. It increases by 4.
 D. It decreases by 4.
 E. It decreases by 2.
23. Which of the following is a value of r for which $(r + 2)(r - 3) = 0$?
- A. 6
 B. 0
 C. -2
 D. -3
 E. -6

24. If $x = 3yz^2$, what is y in terms of x and z ?
- $\frac{x}{3z^2}$
 - $3xz^2$
 - $\left(\frac{1}{3}\right)xz^2$
 - $\frac{z^2y}{3x}$
 - $\frac{\sqrt{x}}{3z}$
25. Which of the following is the product of $(3x^2 - 1)(x^2 - 4)$?
- $3x^4 + 13x^2 + 4$
 - $3x^4 + 5$
 - $3x^4 - 13x^2 + 4$
 - $3x^4 - 12x^2 + 4$
 - $3x^4 + 12x^2 + 4$
26. Reduce $\frac{x^8y^{12}}{x^4y^3z^2}$ to its simplest terms.
- $\frac{x^2y^4}{z^2}$
 - $\frac{x^4y^9}{z^2}$
 - $x^4y^9z^2$
 - $x^2y^{12}z^2$
 - $\frac{x^2y^9}{z^2}$
27. If $x^2 = 36$ and $y^2 = 81$, which of the following CANNOT be the value of $x + y$?
- 15
 - 3
 - 0
 - 3
 - 15
28. What are the values for a that satisfy the equation $(a + y)(a + z) = 0$?
- $-y$ and $-z$
 - $-y$ and z
 - $-yz$
 - y and $-z$
 - y and z
29. If $x + y = 13$ and $2y = 16$, what is the value of x ?
- 4
 - 5
 - 7
 - 8
 - 9
30. For all $x > 0$, $\frac{1}{x} + \frac{3}{4} = ?$
- $\frac{3}{4x}$
 - $\frac{4}{4x}$
 - $\frac{4 + 3x}{4x}$
 - $\frac{4}{4 + x}$
 - $\frac{4 + 3x}{4 + x}$
31. If $\frac{a^x}{a^y} = a^4$ for all $a \neq 0$, which of the following must be true?
- $\sqrt{xy} = 4$
 - $x \times y = 4$
 - $x + y = 4$
 - $x - y = 4$
 - $x \div y = 4$
32. If $|5 - 2x| > 5$, which of the following is a possible value of x ?
- 2
 - 3
 - 4
 - 5
 - 6
33. What value of t will satisfy the equation $0.1(t + 3,420) = t$?
- 3,420
 - 313.64
 - 313.64
 - 342
 - 380
34. If r and s are constants and $x^2 + rx + 12$ is equivalent to $(x + 3)(x + s)$, what is the value of r ?
- 3
 - 4
 - 7
 - 12
 - Cannot be determined from the given information
35. Which of the following calculations will yield an even integer for any integer a ?
- $2a^2 + 3$
 - $4a^3 + 1$
 - $5a^2 + 2$
 - $6a^4 + 6$
 - $a^6 - 3$

36. If $3^{8x} = 81^{3x-2}$, what is the value of x ?

F. -2
G. 0
H. 2
J. 3
K. 4

37. A horse eats 12 bales of hay in 5 days. At this rate, how many bales of hay does the horse eat in $5 + x$ days?

F. $12 + \frac{12x}{5}$
G. $12 + \frac{x}{5}$
H. $\frac{12}{5} + \frac{12}{5x}$
J. $\frac{12}{5} + \frac{x}{5}$
K. $\frac{12}{5} + x$

38. $2x^2 \times 3x^2y^2 \times 5x^2y$ is equivalent to:

A. $30x^8y^3$
B. $30x^8y^2$
C. $30x^6y^3$
D. $11x^8y^3$
E. $11x^6y^2$

39. $4a^3 \times 5a^8 = ?$

A. $9a^5$
B. $9a^{11}$
C. $9a^{24}$
D. $20a^{11}$
E. $20a^{24}$

40. For all n , $(3n + 5)^2 = ?$

A. $6n^2 + 15n + 10$
B. $6n^2 + 30n + 25$
C. $9n^2 + 6n + 10$
D. $9n^2 + 15n + 25$
E. $9n^2 + 30n + 25$

41. Which real number satisfies $(2^n)(8) = 16^3$?

A. 3
B. 4
C. 6
D. 9
E. 12

42. If $f(x) = -3x^2 - 8$, then $f(-4) = ?$

F. -56
G. -40
H. 8
J. 24
K. 40

43. If $4(x - 2) + 5x = 3(x + 3) - 11$, then $x = ?$

F. -3
G. -1
H. 0
J. 1
K. 2

44. $(x^3 + 2x^2 + 3x - 2) - (2x^3 - x^2 - 4)$ is equivalent to:

F. $-x^3 + x^2 + 3x - 6$
G. $-x^3 + 3x^2 + 3x + 2$
H. $2x^3 - 2x^2 + 3x - 2$
J. $2x^6 + x^4 + 3x - 6$
K. $2x^6 + 3x^4 + 3x + 2$

x	0	1	2	3
$f(x)$	-6	-5	-2	3

45. The table above gives values of the quadratic function f for selected values of x . Which of the following defines the quadratic function f ?

A. $f(x) = x^2 - 6$
B. $f(x) = x^2 + 6$
C. $f(x) = 2x^2 - 10$
D. $f(x) = 2x^2 - 6$
E. $f(x) = 2x^2 - 7$

46. $(6a - 12) - (4a + 4) = ?$

A. $2(a + 2)$
B. $2(a + 4)$
C. $2(a - 2)$
D. $2(a - 4)$
E. $2(a - 8)$

47. Which of the following equations expresses z in terms of x for all real numbers x , y , and z , such that $x^5 = y$ and $y^3 = z$?

A. $z = x$
B. $z = \frac{3}{5}x$
C. $z = 3x^5$
D. $z = x^8$
E. $z = x^{15}$

48. $\left(\frac{1}{3}a - b\right)^2 = ?$

F. $\frac{1}{9}a^2 + b^2$
G. $\frac{1}{9}a^2 - \frac{2}{3}ab + b^2$
H. $\frac{1}{3}a^2 - \frac{2}{3}ab + b^2$
J. $a^2 + b^2$
K. $a^2 - \frac{1}{3}ab + b^2$